

Research on the Long term Mechanism of Rural Ecological Governance

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Abstract: This article aims to explore the long-term mechanism for rural ecological governance, intending to provide a theoretical foundation and practical guidance for effectively improving the rural ecological environment. In the research process, the current status and main issues of rural ecological environments were first analyzed, and a theoretical framework for the long-term mechanism was constructed in conjunction with the concept of ecological governance. Through an in-depth study of relevant national policies and the implementation by local governments, as well as an analysis of successful cases, the shortcomings of existing governance models were revealed. This article focuses on how to establish a long-term ecological governance mechanism that aligns with rural realities, clarifying the main indicators, the roles and responsibilities of various stakeholders, and the measures for sustainability and adaptability, striving to achieve a governance model characterized by multi-party collaboration and resource sharing. The study shows that through innovative mechanisms and cooperative governance, the sustainability of rural ecological governance can be effectively enhanced, thereby promoting sustainable rural development. Ultimately, this research provides valuable references for the formulation and practice of relevant policies to facilitate the in-depth advancement of ecological civilization construction.

Keywords: Ecological Restoration; Policy Support; Villager Participation; Sustainable Development; Regulatory Mechanisms

1. INTRODUCTION

With the rapid development of China's social economy, rural ecological environment problems have become increasingly prominent and have become an important bottleneck restricting sustainable development in rural areas. In recent years, governments at all levels have attached great importance to rural ecological governance work, formulated a series of policy measures, and achieved certain results. However, due to the wide scope, difficulty, and historical arrears involved in rural ecological governance, as well as the single and outdated governance methods in some areas, the achievements of rural

ecological governance are difficult to consolidate, and there is still a significant gap between the governance effect and the expectations of the people. Therefore, building a long-term mechanism for rural ecological governance has become an important issue that urgently needs to be addressed (Curran et al., 2014). Rural ecological governance covers multiple aspects such as water environment, soil, air, vegetation, etc., which are related to agricultural production, farmers' lives, and even national food security and ecological security. In recent years, rural ecological problems have shown characteristics of complexity, regionalism, and accumulation, which have put forward higher requirements for rural ecological environment governance. In this context, studying the long-term mechanism of rural ecological governance aims to provide scientific theoretical guidance and practical paths for rural ecological governance in China, which is of great significance for achieving sustainable improvement of rural ecological environment quality and promoting sustainable development of rural economy and society (Palmer & Ruhl, 2015). From the perspective of practical needs, the research on long-term mechanisms for rural ecological governance has the following urgency: firstly, the trend of rural ecological environment deterioration has not been fundamentally reversed, and the governance task remains arduous; Secondly, the construction of the rural ecological governance system is not yet perfect, and the governance capacity needs to be improved; Thirdly, there is insufficient investment in rural ecological governance funds, and the means and methods of governance need to be innovated; Fourthly, farmers have weak awareness of ecological environment and low enthusiasm for participating in ecological governance. Therefore, conducting research on long-term mechanisms for rural ecological governance in response to these issues can help promote the deepening of rural ecological governance work and provide strong support for the implementation of rural revitalization strategies (Tian et al., 2015). The research on the long-term mechanism of rural ecological governance has important theoretical value and practical significance. By analyzing the current situation, problems, and causes of rural ecological governance, we aim to explore the construction of a scientifically reasonable, operationally strong, and sustainable long-term mechanism for rural ecological governance. This will have a profound impact on improving the level of rural ecological governance in China and promoting the construction of rural ecological civilization (Jørgensen, 2015).

1.2 Research purpose and significance

Research Objective: This study aims to explore in depth the long-term mechanism of rural ecological governance, by systematically analyzing the challenges and causes facing the current rural ecological environment, and exploring the construction of a scientific, reasonable, and sustainable ecological governance model. The research aims to clarify the core issues of rural ecological governance, evaluate the effectiveness of existing governance measures, extract successful experiences and lessons, and propose a long-term mechanism framework with operational and promotional value. Through this research, we aim to provide targeted theoretical support and practical guidance for policy makers, practitioners, and academia, promoting the sustainable improvement of rural ecological environment and the smooth implementation of rural revitalization strategies.

Research Meaning: This study has significant theoretical and practical implications. From a theoretical perspective, in-depth research on the long-term mechanism of rural ecological governance can enrich and develop the theory of ecological governance, and fill the gap in the construction of long-term mechanisms in existing research, Enhance the level of understanding of the complex rural ecological environment system. From a practical perspective, the research results will provide scientific basis for the government to formulate and optimize rural ecological governance policies, and help solve the current rural ecological environment governance problems Prominent issues in promoting the coordinated development of rural socio-economic and ecological environment. In addition, this study also helps to enhance public awareness of the importance of rural ecological governance, promote the participation of all sectors of society in ecological civilization construction, and lay a solid foundation for achieving the goals of rural revitalization and sustainable development.

2. THEORETICAL BASIS OF RURAL ECOLOGICAL GOVERNANCE

2.1 Basic concepts of ecological governance

The basic concept of ecological governance originates from a profound understanding and high emphasis on ecological and environmental issues. It refers to the comprehensive use of multidisciplinary knowledge and technological means such as ecology,

environmental science, resource science, and systems engineering in a complex ecosystem where multiple factors such as economy, society, and nature interact, aiming to maintain, restore, and enhance ecosystem service functions, A comprehensive environmental governance activity that achieves harmonious coexistence between humans and nature (Brancalion & van Melis, 2017). Ecological governance emphasizes starting from the integrity and sustainability of the ecosystem, fully mobilizing the enthusiasm of various aspects such as government, enterprises, social organizations, and the public, and comprehensively promoting ecological environment protection and construction through various channels such as policies and regulations, market mechanisms, technological progress, and cultural education. In the basic concept of ecological governance, it includes three levels: prevention, control, and restoration of ecological and environmental problems. At the prevention level, emphasis is placed on measures such as optimizing industrial structure, adjusting production methods, and strictly regulating resource development to prevent potential ecological and environmental problems; The control aspect focuses on timely detection and effective control of existing ecological and environmental problems, reducing the degree of ecological and environmental damage; At the restoration level, efforts are made to restore and rebuild damaged ecosystems, improving their self-healing capabilities and ecological service functions (Scholte et al., 2016). The core of the basic concept of ecological governance is to respect, conform to, and protect nature, fully leverage the self-regulation and self-repair capabilities of ecosystems, and promote sustained improvement of ecological environment quality. This requires attention to the following aspects in the process of ecological governance: One is the principle of integrity. An ecosystem is an organic whole, with its various components interconnected and influencing each other. Therefore, in ecological governance, it is necessary to grasp the integrity of the ecosystem, comprehensively consider various ecological elements such as mountains, waters, forests, fields, lakes, and grasses, and implement integrated ecological protection and restoration measures (Martin et al., 2018). The second principle is systematic. Ecological governance should follow the concept of systems engineering, forming a closed-loop management from planning, design, implementation to evaluation, and ensuring the orderly progress and continuous improvement of ecological governance work. The third principle is scientificity. Ecological governance should rely on the support of science and

technology, fully utilize modern technological means, and improve the accuracy and effectiveness of ecological governance. The fourth principle is public participation. Ecological governance requires extensive mobilization of all social forces, strengthening publicity and education, enhancing public awareness and participation in ecological environment, and forming an ecological environment protection pattern that everyone cares about and participates in together (Samuel et al., 2023). The fifth principle is the guarantee of the rule of law. Ecological governance should be carried out in accordance with the law, improving the legal and regulatory system for ecological environment, increasing law enforcement and supervision efforts, and ensuring the implementation of various measures for ecological governance. The sixth principle is green development. Ecological governance should advocate the concept of green development, promote industrial restructuring and optimization, reduce ecological pressure, and achieve a win-win situation between economic development and ecological environment protection (He et al., 2020). The basic concept of ecological governance is a comprehensive environmental governance activity that focuses on maintaining and enhancing ecosystem service functions, follows ecological principles and systems engineering methods, and involves the participation of the entire society. Only by comprehensively and deeply understanding and grasping this concept can we better promote ecological governance work and achieve harmonious coexistence between humans and nature.

2.2 The current situation and problems of rural ecological environment

Currently, China's rural ecological environment is facing a severe situation and a series of problems. With the rapid development of the economy and the advancement of urbanization, rural areas are under unprecedented pressure, and the ecological environment is not optimistic. On the one hand, excessive use of fertilizers and pesticides in agricultural production processes leads to soil pollution, eutrophication of water bodies, and a decline in biodiversity (Qiao et al., 2022). On the other hand, the arbitrary discharge of rural domestic sewage, the disorderly stacking of household waste, and the transfer of industrial pollution have exacerbated the deterioration of the rural ecological environment. Firstly, the environmental problems caused by agricultural production methods are becoming increasingly prominent. In the pursuit of high yield and efficiency, farmers overly rely on chemical fertilizers and pesticides, leading to the deterioration of soil

structure. The decline in soil fertility has affected the quality of agricultural products. In addition, agricultural waste such as straw and livestock manure have not been effectively utilized and have become an important source of rural environmental pollution. These issues not only constrain the sustainable development of agriculture, but also pose a threat to the physical health of rural residents. Secondly, the problem of rural living pollution is becoming increasingly serious. Due to weak environmental awareness and outdated infrastructure, there is a widespread phenomenon of arbitrary discharge and disorderly stacking of rural domestic sewage and garbage disposal. These pollutants are present during rainfall. Under the erosion of surface runoff, it enters water bodies such as rivers and lakes, exacerbating water pollution. At the same time, rural household waste contains a large amount of difficult to degrade substances such as plastics and batteries, which cause serious pollution to soil and groundwater. In addition, the rural ecological environment also faces the challenge of industrial pollution. With the increasing efforts in urban environmental governance, some polluting enterprises have turned their attention to rural areas, leading to increasingly serious industrial pollution problems in rural areas. These enterprises often do not have complete environmental protection facilities, and the discharged wastewater, exhaust gas, and solid waste cause great damage to the surrounding environment, seriously affecting the quality of life of rural residents (Mingjiao et al., 2019). The issue of rural ecological degradation cannot be ignored. Human factors such as excessive development and indiscriminate logging have led to vegetation damage, soil erosion, and deterioration of the ecological environment. This not only exacerbates the occurrence of natural disasters such as floods and droughts, but also leads to a decrease in biodiversity, posing a threat to the survival of many rare species. The current situation and problems of rural ecological environment in China are worrying. Under new historical conditions, it is necessary to attach great importance to the protection of rural ecological environment, take effective measures, innovate governance models, and build long-term mechanisms. By transforming agricultural production methods, enhancing farmers' environmental awareness, improving infrastructure, and strengthening regulatory enforcement, we strive to improve the rural ecological environment and lay a solid foundation for achieving rural revitalization and sustainable development (Qian et al., 2022).

2.3 Theoretical Framework of long-Term Mechanism



Figure 1: Theoretical framework of long-term mechanism

The construction of a theoretical framework for long-term mechanisms is the key to ensuring the sustained, stable, and effective implementation of rural ecological governance. Firstly, this theoretical framework should be based on systems thinking, viewing rural ecological governance as a complex system engineering that involves multiple factors such as ecological environment, social economy, policies and regulations. In this framework, the core elements include governance subjects, governance objects, governance means, and governance effects. In terms of governance entities, it is necessary to clarify the roles and responsibilities of the government, enterprises, social organizations, and individual farmers in ecological governance. The government should play a leading role, formulate scientific and reasonable policies and regulations, strengthen supervision and law enforcement, and promote the formation of a diversified governance pattern. Enterprises should assume social responsibility, transform their development mode, and achieve green and low-carbon production. Social organizations and individual farmers should actively participate, play a role in autonomy, self-examination, and self-correction, and jointly maintain the rural ecological environment. In terms of governance targets, attention should be paid to prominent

issues of rural ecological environment, such as water pollution, soil pollution, air pollution, ecological damage, etc. Adopt classified governance and comprehensive policies for different governance targets to ensure that governance measures are targeted, operational, and effective (Zhang & Guo, 2023). Governance measures are an important component of the long-term mechanism theoretical framework. Under this framework, legal, economic, technological, educational and other means should be comprehensively utilized to form a collaborative governance effect. Legal means should clarify the legal and regulatory system for ecological governance, increase law enforcement efforts, and severely punish illegal activities. Economic measures should guide enterprises and farmers to participate in ecological governance through policies such as fiscal subsidies, tax incentives, and green finance. Technological means should play a driving role in technological innovation, promote advanced and applicable governance technologies, and improve governance efficiency. Education methods should strengthen the education of farmers' ecological and environmental awareness, and enhance their enthusiasm and ability to participate in ecological governance (Long et al., 2022). In terms of governance effectiveness, the theoretical framework of long-term mechanisms should focus on the sustainability and stability of governance effectiveness. This requires establishing a sound monitoring and evaluation system, dynamically monitoring the process and effectiveness of ecological governance, and timely discovering and solving problems. At the same time, incentive mechanisms should be established to reward entities that have achieved significant results in ecological governance, and to stimulate their enthusiasm for continuous participation in ecological governance (Li et al., 2022). In addition, the theoretical framework of long-term mechanisms should also emphasize cross regional collaboration, departmental linkage, and social co governance. Cross regional collaboration should break through administrative restrictions, promote resource sharing, information exchange, and technological assistance between regions, and form a collaborative governance pattern. Departmental linkage should achieve collaborative cooperation among multiple departments such as government, enterprises, and social organizations, forming a governance synergy. Social governance requires fully leveraging the power of all sectors of society and building a governance system that involves the participation of the government, enterprises, social organizations, and farmers (Zhang et al., 2021).

Table 1 Theoretical Framework of Long term Mechanism for Rural Ecological Governance

Theoretical Dimension	Theoretical Content	Application Strategy
Ecosystem Theory	Researching the structure, function, and dynamic balance of rural ecosystems.	Formulate policies for ecological compensation to maintain ecosystem balance.
Sustainable Development Theory	Emphasizing the coordinated development of economy, society, and environment.	Implement green agriculture to promote sustainable rural development.
Governance Theory	Exploring the subjects, mechanisms, and processes of rural ecological governance.	Establish a governance system that involves multiple stakeholders to enhance governance efficiency.
Circular Economy Theory	Advocating for reduced resource consumption, reuse, and recycling.	Encourage agricultural waste recycling to foster circular agriculture.
Ecological Civilization Theory	Highlighting the value of harmonious coexistence between humans and nature.	Cultivate awareness of ecological civilization and guide the construction of rural ecological culture.

Theoretical framework for the long-term mechanism of rural ecological governance should be based on systematic thinking, focusing on aspects such as governance subjects, governance objects, governance methods, and governance effects. By establishing a sound policy system, innovating governance models, strengthening monitoring and evaluation, and promoting social co governance, it can provide strong guarantees for rural ecological governance. This will help promote the continuous improvement of rural ecological environment and achieve sustainable development of rural economy and society.

3. POLICIES AND PRACTICES OF RURAL ECOLOGICAL GOVERNANCE

3.1 Analysis of relevant national policies

In the research on the long-term mechanism of rural ecological governance in China, relevant national policies play a crucial guiding role. In recent years, the country has attached great importance to ecological environment protection and governance, and has introduced a series of policies aimed at building a long-term mechanism for rural ecological

governance and promoting sustained improvement of the rural ecological environment. Firstly, national policies emphasize the prevention and control of the source of rural ecological environment. By implementing relevant laws and regulations such as the Air Pollution Prevention and Control Law and the Water Pollution Prevention and Control Law, strengthening the supervision of pollution sources, strictly enforcing environmental laws, and ensuring effective protection of rural ecological environment (Hodge, 2001). At the same time, policies encourage the development of smart environmental protection solutions, using advanced technologies such as the Internet of Things and big data to build an environmental monitoring and perception network, and achieve the interconnection and intercommunication of rural ecological environment data. Open sharing provides scientific basis for rural ecological governance. Secondly, national policies emphasize the green development of agriculture and promote the transformation and upgrading of the agricultural industry. The policy encourages the development of green agriculture and circular agriculture, promotes energy-saving and emission reduction technologies and low-carbon production methods, and reduces the negative impact of agricultural production on the rural ecological environment. In addition, the policy also focuses on the construction of rural ecological compensation mechanisms. By implementing ecological compensation policies, it mobilizes the enthusiasm of farmers to participate in ecological governance and promotes the continuous improvement of rural ecological environment quality. Furthermore, national policies focus on improving the construction of rural ecological environment infrastructure. In industries such as new energy vehicle charging stations and electronic specialty gases, the government has introduced a series of policies to support the construction of related infrastructure and provide strong support for rural ecological governance. For example, in the field of new energy vehicle charging stations, the policy is clear that by the end of the 14th Five Year Plan, China's electric vehicle charging guarantee capacity will be further improved, forming a moderately advanced, balanced, intelligent and efficient charging infrastructure system, meeting the charging needs of more than 20 million electric vehicles, and helping to reduce exhaust emissions and pollution in rural areas. In addition, national policies also emphasize rural ecology. Cross regional collaboration and linkage in governance. In terms of watershed governance and regional ecological restoration, policies encourage local governments to strengthen cooperation, jointly promote rural ecological governance, and achieve comprehensive improvement of regional ecological environment quality.

The national policy emphasizes the role of market mechanisms in rural ecological governance. Through policy guidance, encourage enterprises, social organizations, etc. to participate in rural ecological governance, explore diversified investment models, and promote the marketization and socialization of rural ecological governance. At the same time, policies will strengthen the leadership of technological innovation, support the research and application of technology in the field of rural ecological governance, and enhance the capacity of rural ecological governance. The relevant national policies provide strong guarantees for the construction of long-term mechanisms for rural ecological governance. Under policy guidance, China's rural ecological governance work is developing towards greater specialization, intelligence, and marketization, laying a solid foundation for achieving fundamental improvement and sustainable development of the rural ecological environment.

3.2 Implementation status of local governments

The implementation of local governments plays a crucial role in rural ecological governance in China. In order to implement the national policies on rural ecological governance, local governments have actively taken a series of effective measures based on local conditions. On the one hand, local governments are increasing financial investment, optimizing policy systems, and promoting rural ecological governance work. This includes improving the efficiency of fiscal fund utilization, integrating various agricultural funds, increasing support for green industries such as ecological agriculture, circular agriculture, and organic agriculture, guiding farmers to transform their production methods, reducing the use of fertilizers and pesticides, and improving soil quality in farmland. On the other hand, local governments strengthen policy guidance, promote technological innovation, and enhance rural ecological governance capabilities. Local governments actively introduce and promote advanced ecological governance technologies, strengthen cooperation with universities and research institutes, cultivate a group of innovative entities in rural ecological governance technology, and promote the application of scientific and technological achievements in the field of rural ecological governance. At the same time, local governments also encourage farmers to participate in ecological governance technology innovation, cultivate a group of farmer technicians with ecological governance skills, and enhance the main position of farmers in ecological governance. In addition, local governments should strengthen organizational coordination and build a diversified ecological governance system. Local governments actively guide

enterprises, social organizations, and farmers to participate in rural ecological governance, promoting the formation of an ecological governance pattern led by the government, with enterprises as the main body and extensive participation of social organizations and farmers. Through government procurement of services, PPP models, and other means, guide social capital to invest in the field of rural ecological governance, and leverage the role of market mechanisms in resource allocation. In terms of policy practice, local governments focus on promoting the following work: firstly, strengthening the monitoring and evaluation of rural ecological environment, establishing and improving the ecological environment monitoring network, and providing scientific basis for rural ecological governance. The second is to increase efforts in ecological restoration, comprehensively manage degraded land, polluted soil, etc., and restore and improve the quality of rural ecological environment. The third is to promote the resource utilization of agricultural waste, strengthen the collection, treatment, and utilization of agricultural waste such as crop straw and livestock manure, and reduce agricultural non-point source pollution. The fourth is to strengthen the protection and construction of rural ecology, implement projects such as returning farmland to forests, grazing land to grassland, and wetland protection, and enhance the service functions of rural ecosystems. Local governments have achieved significant results in rural ecological governance by closely focusing on national policy guidance, combining local realities, innovating work methods, and promoting rural ecological governance. In future work, local governments will continue to increase policy implementation efforts, improve long-term mechanisms, and provide strong guarantees for rural ecological governance. At the same time, local governments will also focus on leveraging market and social forces, building a diversified ecological governance system, promoting continuous improvement of rural ecological environment, and assisting rural revitalization and green development.

3.3 Success Case Analysis

In the policy and practice process of rural ecological governance in China, many successful cases have emerged, which provide valuable experience for the research of long-term mechanisms of rural ecological governance in China. Here are several representative successful case analyses. A rural area in Zhejiang Province has achieved a positive interaction between ecological governance and economic development through its unique "ecological county" strategy. In terms of policy-making,

the region prioritizes ecological protection, strictly enforces environmental regulations, and imposes restrictions on industrial enterprises. Implement a strict admission system, while implementing a green orientation for agricultural production and promoting organic and circular agriculture. In practice, the region has implemented an ecological compensation mechanism to guide farmers to participate in ecological environment protection and enhance their environmental awareness. In addition, we have vigorously developed the ecotourism industry, transforming ecological advantages into economic advantages, achieving a win-win situation between rural ecological governance and economic development. A mountainous area in Sichuan Province has carried out large-scale afforestation and returning farmland to forests projects based on national key ecological engineering projects. At the policy level, the local government has signed ecological compensation agreements with farmers to safeguard their interests in the process of ecological governance. In practice, the region actively promotes the business model of "company+base+farmers", guiding farmers to develop agroforestry and increase their income. Through the close integration of policies and practices, the region has successfully transformed barren mountains into oases, continuously improving the living standards of farmers and providing strong guarantees for the long-term mechanism of rural ecological governance. A rural area in Jiangsu Province has implemented a series of rural ecological governance projects with water environment governance as a breakthrough point. In terms of policy, the region has clearly defined the goals and tasks of water environment protection, increased the punishment for polluting enterprises, and implemented strict environmental supervision on agricultural production. In practice, the region has established a rural domestic sewage treatment system by introducing advanced sewage treatment technology, effectively solving the problem of rural domestic sewage. At the same time, ecological agriculture models such as rice paddy fish farming and rice shrimp co cultivation have been promoted, which has increased agricultural output value and achieved the organic combination of rural ecological governance and agricultural development. In a rural area of Hubei Province, the main role of villagers has been fully utilized in ecological governance. In terms of policy, the local government encourages villagers to participate in ecological governance decisions and has formulated a series of preferential policies to guide villagers to participate in ecological construction projects. In practice, the village has established an ecological construction council through village self governance, responsible for supervising and managing ecological

governance projects. At the same time, villagers spontaneously organized environmental protection activities such as afforestation and garbage classification, forming an ecological governance pattern with public participation. This successful case demonstrates that leveraging the role of villagers as the main body is the key to the long-term mechanism of rural ecological governance. Through the analysis of the above successful cases, it can be found that the long-term mechanism of rural ecological governance relies on the close combination of policies and practices, fully leveraging the power of multiple parties such as the government, enterprises, and farmers to achieve a win-win situation between ecological governance and economic development. This provides useful reference and inspiration for rural ecological governance in China.

4. CONSTRUCTION OF LONG TERM MECHANISMS FOR RURAL ECOLOGICAL GOVERNANCE

4.1 Main indicators of long-term mechanism-

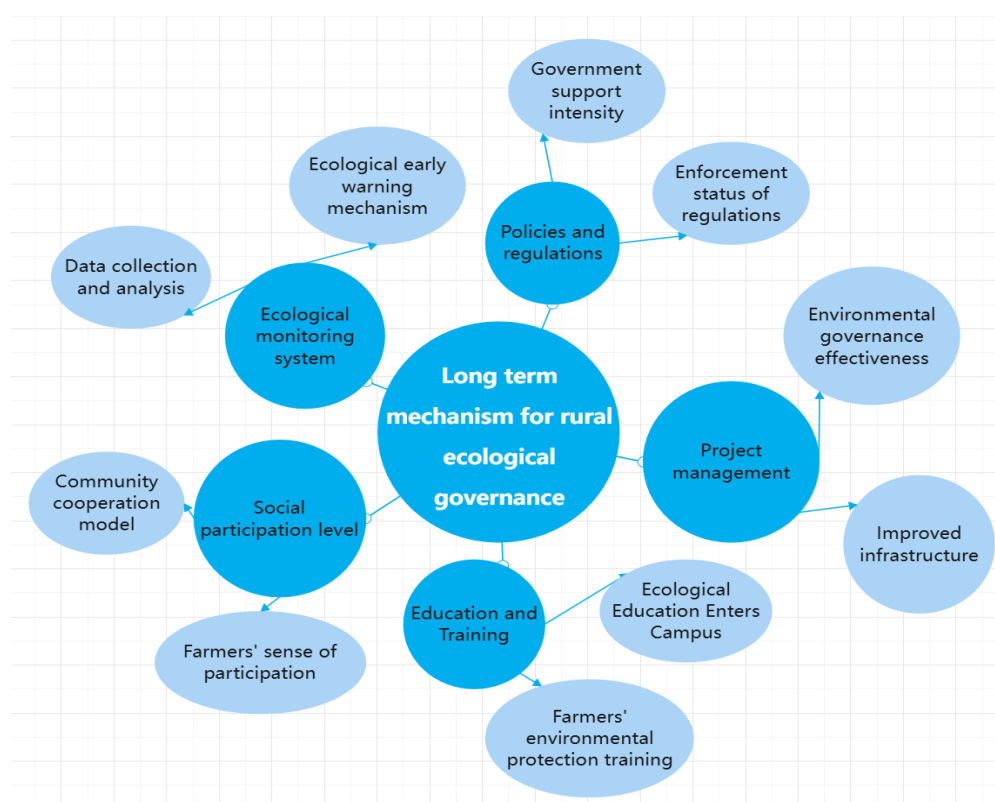


Figure 2: Main indicators of long-term mechanism for rural ecological governance

The main indicators of the long-term mechanism cover multiple aspects necessary to ensure sustained, stable, and healthy development in the process of rural ecological governance. Firstly, this includes a

comprehensive system of laws, regulations, and policies that form the foundation of rural ecological governance, ensuring the legality and legitimacy of governance actions. In addition, the main indicators should include long-term monitoring of governance effectiveness and Assessment mechanisms, such as regular monitoring of key ecological indicators such as air quality, water quality, and soil health status, to ensure the consolidation of governance achievements. In the governance system, key talent cultivation and incentive mechanisms are also indispensable. This means establishing a professional and high-quality ecological governance team, continuously improving the political literacy and professional skills of practitioners through a long-term talent training mechanism, and emphasizing the combination of morality and ability to promote the in-depth development of governance work. The incentive mechanism focuses on balancing long-term and short-term goals, ensuring the motivation and sustainability of governance actions through a scientific and reasonable salary management system and performance evaluation system. On the other hand, the use of economic means is also an important indicator for building long-term mechanisms. This includes the improvement of ecological compensation mechanisms, green finance policies, and financial and tax support policies, aiming to guide and encourage all sectors of society to participate in rural ecological governance through the role of economic leverage, and achieve a win-win situation between ecological environment and economic development. In addition, long-term mechanisms should also focus on technological innovation and transformation applications. Continuously promoting technological progress and innovation in agricultural non-point source pollution control, ecological restoration technology, and resource recycling, transforming scientific research achievements into practical governance capabilities, and improving the efficiency and quality of ecological governance. At the administrative level, building an efficient and transparent regulatory system is one of the key indicators of a long-term mechanism. This involves the transformation of government functions, strengthening law based administration, improving regulatory systems, increasing transparency and public participation in decision-making, and ensuring effective implementation of governance policies. Social participation and the enhancement of public awareness are also important components of long-term mechanisms. Through education and publicity, enhance the ecological environment protection awareness of rural residents, stimulate the enthusiasm of the public to participate in ecological governance, and build a governance model that involves the participation of the

government, enterprises, and the public.

Table 2 Main indicators of long-term mechanism for rural ecological governance

Indicator Names	Weight	Evaluation criteria
Ecological Environment Quality Index	0.25	Index range 0-1: the higher the value, the better the ecological quality.
Rural Domestic Waste Treatment Rate	0.2	Treatment rate range 0%-100%: the higher the value, the better the treatment effect.
Reduction Rate of Pesticide and Fertilizer Usage	0.15	Reduction rate range 0%-100%: the higher the value, the more environmentally friendly the use.
Concentrated Treatment Rate of Rural Sewage	0.15	Treatment rate range 0%-100%: the higher the value, the better the treatment effect.
Biodiversity Conservation Rate	0.1	Protection rate range 0%-100%: the higher the value, the better the biodiversity protection.
Completion Rate of Ecological Restoration Projects	0.1	Completion rate range 0%-100%: the higher the value, the better the ecological restoration effect.
Awareness Rate of Environmental Protection among Farmers	0.05	Awareness rate range 0%-100%: the higher the value, the stronger the environmental protection awareness among farmers.

The main indicators of the long-term mechanism for rural ecological governance should include: a sound legal and regulatory policy system, long-term monitoring and evaluation mechanisms, talent cultivation and incentive mechanisms, the use of economic means, technological innovation and transformation, efficient administrative management, as well as social participation and public awareness enhancement. These indicators are interrelated and mutually supportive, forming a multi-level, multi angle, and all-round governance framework aimed at promoting the sustainable improvement of rural ecological environment and the construction of ecological civilization.

4.2 The roles and responsibilities of various stakeholders

In the process of constructing a long-term mechanism for rural ecological governance in our country, all stakeholders shoulder indispensable roles and responsibilities. The joint participation of multiple entities such as government, enterprises, farmers, research institutions, and social organizations to form a collaborative governance situation is of great

significance for promoting the sustainable improvement of rural ecological environment. Firstly, the government plays a leading role in rural ecological governance. The government should increase policy support, formulate a series of laws and regulations that are conducive to rural ecological environment protection, establish and improve ecological compensation mechanisms, and guide and promote all parties to actively participate in rural ecological governance. At the same time, the government needs to strengthen supervision, strictly enforce environmental regulations, crack down severely on behaviors that damage the ecological environment, and ensure that various measures for rural ecological governance are implemented. In addition, the government should increase investment in rural environmental protection, strengthen infrastructure construction, and enhance the ability of rural ecological environment governance. Secondly, as important participants in rural ecological governance, enterprises have the responsibility to transform their development mode and achieve green development. Enterprises should strictly comply with environmental regulations, increase investment in environmental protection facilities, improve resource utilization efficiency, and reduce pollutant emissions. On this basis, enterprises can actively participate in rural ecological restoration and environmental protection projects through technological innovation, industrial upgrading, and other means, providing technical support and financial guarantees for rural ecological governance. As beneficiaries and participants of rural ecological governance, farmers have the responsibility to transform traditional production and lifestyle, and practice ecological agriculture. Farmers should actively adopt environmentally friendly agricultural production technologies, reduce the use of fertilizers and pesticides, improve the resource utilization of crop straw and livestock manure, and reduce the impact of agricultural production on the ecological environment. At the same time, farmers also need to establish environmental awareness, change their bad habits, participate in rural ecological environment governance, and jointly maintain a beautiful home. Research institutions play a role in providing technical support for rural ecological governance. Research institutions should actively carry out research on rural ecological environment protection and restoration technologies, providing scientific basis and technical support for rural ecological governance. In addition, research institutions need to strengthen communication and exchange with government, enterprises, farmers and other entities, promote the transformation of scientific and technological achievements, and introduce advanced and applicable environmental protection technologies into rural ecological governance practices. Social

organizations play a role in promoting, guiding, and supervising rural ecological governance. Social organizations should actively carry out environmental protection publicity and education activities, enhance farmers' environmental awareness, and guide farmers to participate in rural ecological governance. At the same time, social organizations can also expose and supervise the rectification of problems in rural ecological governance through public opinion supervision, public participation, and other means, and promote all stakeholders to fulfill their environmental responsibilities. The construction of a long-term mechanism for rural ecological governance cannot be separated from the joint participation and efforts of all stakeholders. The government, enterprises, farmers, research institutions, and social organizations should clarify their roles and responsibilities, collaborate to promote rural ecological governance, and contribute to the fundamental improvement and sustainable development of rural ecological environment.

4.3 Measures to ensure sustainability and adaptability

The key to building a long-term mechanism for rural ecological governance lies in ensuring sustainability and adaptability, which requires a series of comprehensive safeguard measures. Firstly, we should fully recognize the complexity and long-term nature of rural ecological governance, incorporate it into the overall layout of ecological civilization construction, and form a top-down policy promotion and support. Policy formulation should focus on foresight and continuity, ensuring that governance measures can adapt to the ecological characteristics and socio-economic development needs of different rural areas. In specific implementation, emphasis should be placed on strengthening top-level design and building a safeguard system that includes multiple aspects such as law, economy, technology, and education. Legal protection is the foundation, and it is necessary to improve relevant laws and regulations, clarify the responsible parties and rights of ecological governance, establish and improve the compensation system for ecological environment damage, and use legal means to ensure the seriousness and long-term effectiveness of rural ecological governance. Economic security is key. By establishing an ecological compensation fund, implementing policies such as tax incentives and investment subsidies, we can motivate farmers and local governments to actively participate in ecological governance and protection. In terms of technical support, we should pay attention to technological innovation and promotion, and improve the efficiency and effectiveness of governance measures. Relying on modern information

technology, establish a rural ecological environment monitoring network to real-time grasp changes in the ecological environment and provide data support for scientific decision-making. At the same time, we will strengthen the research on key technologies for ecological governance, promote applicable ecological agriculture technologies, improve the efficiency of agricultural resource utilization, and reduce environmental pollution. Education security focuses on improving farmers' ecological awareness and participation ability. By carrying out various forms of ecological civilization education, we aim to strengthen farmers' understanding of ecological environment protection and cultivate them to become active participants in ecological governance. In addition, it is necessary to strengthen the training of rural grassroots cadres, enhance their ecological governance capabilities, and ensure that policy measures can be effectively implemented at the grassroots level. Adaptive safeguard measures are equally important, which requires governance mechanisms to be able to flexibly respond to external environmental changes and internal demand adjustments. Therefore, it is necessary to establish a dynamic evaluation and adjustment mechanism, regularly evaluate the effectiveness of governance, timely identify problems, and adjust governance strategies. At the same time, local governments are encouraged to explore practical ecological governance models based on their own conditions, promoting the diversification and localization of governance measures. The participation and support of the general public are indispensable parts of the long-term mechanism for rural ecological governance. We should establish a sound mechanism for information disclosure and public participation, so that the public can effectively supervise the entire process of ecological governance, form a positive interaction among the government, enterprises, and society, and jointly promote the continuous deepening and effective implementation of rural ecological governance. Through these measures, a stable and flexible long-term mechanism for rural ecological governance can be established, providing a solid guarantee for achieving fundamental improvement of the rural ecological environment.

5. CONCLUSION

Conclusion: Rural ecological governance, as a systematic project, is related to the overall situation of national ecological civilization construction and the implementation of rural revitalization strategy. The

research and construction of its long-term mechanism have profound significance. By analyzing the current situation of rural ecological governance and combining successful cases of ecological governance at home and abroad, this article proposes that the construction of a long-term mechanism for rural ecological governance should be based on the principles of systematicity, comprehensiveness, and sustainability, focusing on the integration and coordination of policies and regulations, technological innovation, public participation, market mechanisms, and monitoring and evaluation. Practice has proven that policy guidance and legal regulation are the cornerstone of rural ecological governance. By clarifying ecological governance responsibilities, increasing law enforcement efforts, and improving ecological compensation mechanisms, governance efficiency can be effectively enhanced. Technological innovation and promotion application are key to promoting the modernization of rural ecological governance. Increasing scientific research investment in clean energy, ecological agriculture, waste recycling, and promoting the popularization and application of green technologies can help improve governance efficiency. In addition, public participation is a deeply rooted guarantee for rural ecological governance. By strengthening environmental protection publicity and education, cultivating ecological culture, and encouraging villagers' autonomy, it can enhance villagers' environmental awareness and participation enthusiasm, and form an ecological governance pattern of co construction, co governance, and sharing. At the same time, the fundamental role of market mechanisms in resource allocation cannot be ignored. Using market means to stimulate governance vitality, such as developing ecological industries, promoting green finance, and improving carbon trading markets, can promote rural economic development and achieve dual benefits of ecological environment protection. The establishment and improvement of a monitoring and evaluation system are crucial for understanding the dynamics of rural ecological environment, evaluating governance effectiveness, and adjusting governance strategies in a timely manner. By establishing a normalized and standardized monitoring network, as well as a scientific and fair evaluation mechanism, data support and decision-making basis are provided for rural ecological governance. The research on the long-term mechanism of rural ecological governance should form a comprehensive system of diversified co governance and multiple measures to ensure the continuity and effectiveness of governance work. In this process, the government should play a leading role, enterprises should assume social responsibility, and the public should actively participate to

jointly promote the continuous improvement of rural ecological environment quality and help realize the grand blueprint of a beautiful China. In the near future, China's rural ecological governance has a long way to go and requires continuous exploration and innovation to form a long-term mechanism for rural ecological governance with Chinese characteristics, contributing Chinese wisdom and solutions to the construction of global ecological civilization.

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